REMARKS

Claims 1-41 are pending in the present application and all were rejected in the March 22, 2007 Office Action. All claims were rejected; all rejections are traversed.

Reconsideration of the claims is respectfully requested.

CLAIM REJECTIONS -- 35 U.S.C. § 103

In Sections 3-5 of the March 22, 2007 Office Action, the Examiner rejected Claims 1-3, 5-7, 16-18, 20-22 and 31-35 under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent Application Publication No. 2002/0146983 to *Scherzer, et al.* (hereinafter "Scherzer") in view of U. S. Patent No. 7,130,663 to *Guo* (hereinafter "Guo").

In Section 6 of the March 22, 2007 Office Action, the Examiner rejected Claims 4 and 19 under 35 U.S.C. §103(a) as being unpatentable over Scherzer in view of Guo, and further in view of U. S. Patent No. 6,453, 177 to *Wong, et al.* (hereinafter, "Wong").

In Section 7 of the March 22, 2007 Office Action, the Examiner rejected Claims 8 and 23 under 35 U.S.C. §103(a) as being unpatentable over Scherzer in view of Guo, and further in view of U. S. Patent No. 6,148,208 to *Love* (hereinafter "Love").

In Section 8 of the March 22, 2007 Office Action, the Examiner rejected Claims 9, 10, 24, 15 and 36 under 35 U.S.C. §103(a) as being unpatentable over Scherzer in view of Guo, and further in view of U. S. Patent No. 7,054,662 to *Judson* (hereinafter "Judson").

In Section 9 of the March 22, 2007 Office Action, the Examiner rejected Claims 11-15, 26-30 and 37-41 under 35 U.S.C. §103(a) as being unpatentable over Scherzer in view of Guo, and Judson, and further in view of U. S. Patent Application Publication No. 2004/0023659 to *Xiao, et al.* (hereinafter "Xiao").

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing a prima facie case of obviousness. MPEP § 2142, p. 2100-133 (8th ed. rev. 4, October 2005). Absent such a prima facie case, the applicant is under no obligation to produce evidence of nonobviousness. *Id.* To establish a *prima facie* case of obviousness, three basic criteria must be met: *Id.* First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *Id.* Second, there must be a reasonable expectation of success. *Id.* Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *Id.* The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *Id.*

Claim 1 requires

> 1. For use in a wireless network, a base station capable of serving multiple mobile stations, said base station comprising:
>
> a transceiver operable to receive from a select one of the multiple mobile stations a pilot strength signal and a power control signal; and
>
> beam forming circuitry operable to form a downlink traffic beam spatially directed to serve said select one of said multiple mobile stations, said downlink traffic beam having a beam width set

> as a function of said pilot strength signal and said power control signal.

The Examiner indicates a belief that Scherzer teaches a majority of these limitations. The Examiner alleges that Scherzer teaches the claimed transceiver receiving a pilot strength signal at paragraphs 0007 and 0138:

> [0007] Accordingly, in a cellular communication network, a base transceiver station (BTS) or the like, may operate to receive information from mobile units with respect to a received signal as experienced by the mobile unit in order to make determinations as to the transmit power level to be utilized in communications with this particular mobile unit. This is an example of closed control loop operation.
> ...
> [0138] Although the present invention has been discussed above with respect operation of algorithms of the present invention only, it should be appreciated that the link optimization techniques of the present invention may be implemented in cooperation with other communication link control systems. For example, mobile units operating according to IS-95 and GSM protocols allow for mobile unit feedback, such as the mobile unit providing a pilot measurement message, for power level control. The present invention may operate with this feedback information in determining beam characteristics in cooperation with the protocol's operation or separate therefrom.

As can be seen, Scherzer does indeed describe that the mobile unit can provide a pilot measurement message for power level control, and this can be used in determining beam characteristics.

The Examiner also alleges that Scherzer teaches the claimed beam forming circuitry operable to form a downlink traffic beam spatially directed to serve said select one of said multiple mobile

stations, said downlink traffic beam having a beam width set as a function of said pilot strength signal and said power control signal at paragraphs 0009 and 0138-0140:

> [0009] Further capacity and/or signal quality improvement may be provided in communication systems, such as the aforementioned point to multipoint wireless communication systems, through the use of directional antenna beams in the communication links. For example, adaptive array antennas may be utilized to provide enhanced signal quality through advanced "beam forming" techniques as shown and described in the above referenced patent application entitled "Practical Space-Time Radio Method for CDMA Communication Capacity Enhancement." For example, angle of arrival (AOA) information determined from a received signal at an adaptive array antenna may be utilized in accurately determining beam forming coefficients for use in the reverse link in order to provide improved capacity.
>
> ...
>
> [0138] Although the present invention has been discussed above with respect operation of algorithms of the present invention only, it should be appreciated that the link optimization techniques of the present invention may be implemented in cooperation with other communication link control systems. For example, mobile units operating according to IS-95 and GSM protocols allow for mobile unit feedback, such as the mobile unit providing a pilot measurement message, for power level control. The present invention may operate with this feedback information in determining beam characteristics in cooperation with the protocol's operation or separate therefrom.
>
> [0139] For example, in a system utilizing a protocol implementing power level control, such as IS-95, the present invention may operate to confirm that the power level adjustment is not the source of and/or the solution to the presently measured channel characteristics to avoid anomalous operation associated with each control loop attempting to address a same observed phenomena. For example, the aforementioned power control techniques often attempt to redress increases in detected error rates through increased transmit power levels. Accordingly, a preferred embodiment of the present invention operates to obtain channel characteristic information, such as the aforementioned frame error reports, just after a change in beam

> configuration before a power control loop has reacted to redress any resulting channel characteristic changes, such as an increase or decrease in frame error rate. A timing diagram illustrating the timing of a frame error report as may be used according to this embodiment of the present invention is shown in FIG. 6 As shown in FIG. 6, the earlier frame error report is preferably utilized according to this embodiment of the invention while the later frame error report is ignored.
>
> [0140] Although the preferred embodiment has been described above with respect to providing beam forming in the forward link, it should be appreciated that communication link optimization according to the present invention is not limited to beam forming. For example, a set of complex weights may be applied to the signals of an antenna array to provide a signal optimized for experienced channel conditions without forming a typical antenna beam but rather a plurality of signals which constructively combine at a given point in the system to provide a desired communication link. Moreover, it should be appreciated that the concepts of the present invention are not limited forward channel links and/or wireless communications, but may be applied to any communication channel in which the a communication link is to be optimized for channel conditions experienced without requiring a large amount of feedback information.

These passages describe that "beam forming" can be performed in response to angle of arrival (AOA) information or a pilot measurement message. In particular, there is no teaching or suggestion that any beam forming can or should be performed as a function of a power control signal, contrary to the Examiner's assertion. This is particularly clear, as the Examiner concedes that Scherzer doesn't teach a power control signal at all.

The Examiner looks to Guo for a power control signal, citing col. 9, line 59 – col. 10, line 34:

> FIG. 3 shows a proposes frame structure of an uplink physical channel. Referring to FIG. 3, the uplink dedicated physical data channel (uplink DPDCH) and uplink dedicated physical control channel (uplink DPCCH) are I/Q multiplexed within each radio frame

so that the two channels are provided simultaneously. The DPDCH is used to carry data while the DPCCH is used to carry control information. The DPCCH consists of pilot bits (PILOT) for channel estimation, transport format indicator (TFI) bits (optional), feedback information (FBI) bits and transmit power control (TPC) bits. The feedback information bits are used to support techniques which require feedback between the mobile unit and the base station. Such techniques include closed loop mode transmit diversity and site selection diversity. As will be described later, the feedback information bits may also be used in embodiments of the present invention to implement adaptive antenna techniques.

FIG. 4 illustrates the principle of adaptive directional transmission beams in a mobile communications system. In FIG. 4, base station 10 transmits signals to mobile units 12, 14, 16 using transmission beam patterns 20, 22 and 24 respectively. Each transmission beam pattern is produced by using an array of individual antenna elements provided at the base station to transmit different respective amplitude and/or phase adjusted versions of the transmission signal to be sent to the mobile unit concerned. The transmission beam patterns are directional, so that each transmission beam pattern points towards the corresponding mobile unit. Furthermore, the power of each transmission beam pattern is adjusted so that the range of the beam is sufficient to allow communication with the corresponding mobile unit, without using excessive transmission power. As the mobile units 12, 14, 16 roam within the area of coverage of the base station 10, the direction and power of the transmission beam patterns 20, 22, 24 are controlled adaptively to ensure that the mobile units remain within the corresponding transmission beams. For example, if the mobile unit 12 moves to a location indicated by 12', then it will no longer be within the area of coverage of transmission beam pattern 20. In this case, the direction of transmission beam pattern 20 must be adapted as the mobile unit 12 moves, as indicated by the dashed transmission beam pattern 20', to ensure continuous coverage.

It is important to note that while the uplink DPCCH is described as having transmit power control (TPC) bits, nothing in Guo describes any use of these bits at all. Guo does describe generating the bit in col. 12, and then indicates that these bits can be used to form beam quality

indicators, that can be fed to a comparator, that can produce a feedback signal, that can be fed into a beam former unit. Finally, this feedback signal, now far removed from any TPC bits, can be used to adjust the adjusts the point direction of transmission beams. This point direction cannot be fairly said to be any sort of function of the original TCP bits.

As is clear, while Guo does describe these "TCP bits", nothing in Guo teaches or suggests that a beam width can or should be adjusted as a function of a power control signal.

As Scherzer does not describe having a beam width set as a function of a pilot strength signal and a power control signal, and Guo does not describe having a beam width set as a function of a pilot strength signal and a power control signal, no combination of these references can teach or suggest this limitation of claim 1. A similar limitation is in independent claims 16 and 31.

All independent claims include these limitations not taught or suggested by Scherzer or Guo, alone or in combination. Thus, all claims distinguish over these references, and the obviousness rejections of claims 1-3, 5-7, 16-18, 20-22 and 31-35 are traversed.

Wong, Love, Judson, and Xiao similarly fail to teach forming a beam having a beam width set as a function of a power control signal. As such, no combination of any cited references teach or suggest the limitations of the independent claims, and all rejections of all claims are traversed.

Accordingly, the Applicant respectfully requests the Examiner to withdraw the § 103 rejection with respect to these claims.

SUMMARY

For the reasons given above, the Applicant respectfully requests reconsideration and allowance of the pending claims and that this application be passed to issue. If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Applicant respectfully invites the Examiner to contact the undersigned at the telephone number indicated below or at ***wmunck@munckbutrus.com***.

The Commissioner is hereby authorized to charge any additional fees connected with this communication or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,

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